

**Abstract**

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The invention relates to a process for preparing 4-vinylcyclohexene, which comprises the steps

(A) providing an n-butane-containing feed gas stream,

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(B) feeding the n-butane-containing feed gas stream into at least one dehydrogenation zone and dehydrogenating n-butane to butadiene to give a product stream comprising butadiene, n-butane, possibly 1-butene and 2-butene and possibly water vapor and other secondary constituents,

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(C) feeding the product stream from dehydrogenation, if appropriate after separating off water vapor and secondary constituents, into a dimerization zone and catalytically dimerizing butadiene to give a product stream comprising 4-vinylcyclohexene, n-butane and possibly 1-butene, 2-butene and unreacted butadiene, and

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(D) separating off 4-vinylcyclohexene from the product stream from the dimerization and recirculating n-butane and possibly 1-butene, 2-butene and unreacted butadiene to the dehydrogenation zone.

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(Figure 1)